

IN THE CLAIMS:

1. (Original) A method of transferring molecules of interest from an electrophoretic polymer gel to a MALDI target plate comprising the steps of: (i) providing an electrophoretic gel containing one or more molecules of interest; (ii) replacing water within the electrophoretic gel with a cosolvent mixture; (iii) positioning a pin over the gel and penetrating the gel with the pin; (iv) energizing the pin to deplete the gel in a region surrounding the one or more molecules of interest, causing the cosolvent mixture to surround the one or more molecules of interest; (v) lifting the pin out of the gel, the pin carrying a drop of the cosolvent mixture containing the one or more molecules of interest; and (vi) contacting a MALDI target plate with the pin, the contacting causing the drop of cosolvent mixture containing the one or more molecules of interest to be deposited on the MALDI target plate.
2. (Original) The method of claim 1, wherein the viscosity, surface tension and vapor pressure of the cosolvent mixture cause the drop of cosolvent mixture containing the one or more molecules of interest in the gel to adhere to the pin.
3. (Original) The method of claim 1, wherein the viscosity, surface tension and vapor pressure of the cosolvent mixture cause the drop of cosolvent mixture containing the one or more molecules of interest to be transferred to and adhere to the MALDI target plate from the pin.
4. (Original) The method of claim 1, wherein the viscosity, surface tension and vapor pressure of the cosolvent mixture cause the drop of cosolvent mixture containing the one or more molecules of interest to maintain its position on the MALDI target plate, without substantial evaporation.
5. (Original) The method of claim 1, wherein the cosolvent mixture is a water and glycerol mixture of 10% to 90% by volume glycerol.
6. (Original) The method of claim 1, wherein the cosolvent mixture is a water and polyol mixture.
7. (Original) The method of claim 1, wherein the energizing of the pin is effected by ultrasound vibration.

8. (Original) The method of claim 7, wherein the energy of the ultrasound vibration is between 0.1 and 5 watts per square centimeter.
9. (Original) The method of claim 7, wherein the frequency of the ultrasound vibration is between 10 kilohertz to 1 megahertz.
10. (Original) The method of claim 1, wherein the pin is energized for 10 seconds to 120 seconds.
11. (Original) The method of claim 1, wherein the diameter of the pin at the tip is between 50 microns to 500 microns.
12. (Original) The method of claim 1, wherein the drop of cosolvent mixture containing the one or more molecules of interest is between 1 to 2000 nanoliters in size.
13. (Original) The method of claim 1, wherein the drop of cosolvent mixture containing the one or more molecules of interest is between 1 to 100 nanoliters in size.
14. (Original) The method of claim 1, wherein the diameter of the drop deposited on the MALDI target plate is between 50 and 500 microns.
15. (Original) The method of claim 1, further comprising the step of washing the pin in a submersion bath and repeating the steps of claim 1 one or more times to deposit a plurality of drops on the target plate.
16. (Original) The method of claim 15, wherein the density of drops on the target plate is between 100 and 1000 drops per square centimeter.
17. (Original) The method of claim 15, further comprising the steps of depositing a reagent on the target plate, such that the reagent contacts the deposited drops of cosolvent mixture containing the one or molecules of interest; and allowing the reagent to react with the one or molecules of interest in the deposited drops.

18. (Original) The method of claim 17, wherein the depositing of the reagent is effected by a means selected from the group consisting of aerosol deposition, microprinting, pin printing, positive displacement pipetting and piezo printing.

19. (Original) The method of claim 1, wherein the one or more molecules of interest are selected from the group consisting of proteins, peptides, DNA, RNA, nucleotides, enzymes, amino acids, substrates, catalysts, salts, buffers, cofactors, reaction-altered chemical compounds, a member of a combinatorial library of chemical compounds, a component of a drug screening reaction and combinations thereof.

20. (Original) The method of claim 1, wherein the water in the electrophoretic gel is replaced by the cosolvent mixture by incubating the gel in the cosolvent mixture for a period of between 15-120 minutes.

21. (Original) The method of claim 15, further comprising preparing the target plate with the deposited drops for MALDI mass spectrometry analysis by drying the deposited drops and coating the target plate with a MALDI matrix.

22-47. (Canceled)